

REMARKS

In the patent application, claims 1-24 are pending. In the office action, all pending claims are rejected.

Applicant has amended claims 1, 7, 11-13, 16, 17, 20 and 24.

Claims 1, 11 and 16 are amended to include the limitation that each simplified segment candidate has a start segment point and an end segment point and each audio sub-segment has a start-point pitch value and an end-point pitch value, wherein the start segment points of at least some segment candidates are different from the start-point pitch values of the corresponding sub-segments and the end segment points of at least some segment candidates are different from the end-point pitch values of the corresponding sub-segments.

Similarly, claims 17, 20 and 24 are amended to include the limitation that each simplified segment candidate has a first end point and a second end point and each audio sub-segment has a start-point pitch value and an end-point pitch value, wherein the first end points of at least some segment candidates are different from the start-point pitch values of the corresponding sub-segments and the second end points of at least some segment candidates are different from the end-point pitch values of the corresponding sub-segments.

The support for the amendment can be found on Figure 2 which shows that most of the end points of the linear segments are different from the start-point pitch values and the end-point pitch values of the corresponding sub-segments. Take the second linear segment, for example; its start segment point is approximately 35 and its end segment point is approximately 41.6, whereas the start-point pitch value and the end-point pitch value of the corresponding audio sub-segment (between $t=1.22s$ and $t=1.34s$) are approximately 36.8 and 43, respectively.

Claims 7, 12 and 13 are amended to make the terms consistent with the amended independent claims.

No new matter has been introduced.

At section 3 of the office action, claims 1-5, 7-12, 15, 17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by *Lee et al.* ("A very low bit rate speech coder based on a recognition/synthesis paradigm" IEEE Trans on Speech and Audio Processing, Vol. 9, No. 5, July

2001, hereafter referred to as *Lee*). The Examiner states that *Lee* discloses an audio coding method as claimed.

It is respectfully submitted that the approximation methods disclosed in *Lee* are different from the claimed invention in that all of the end points of the piecewise linear segments in *Lee* are selected from the pitch values of the original pitch (FO) contour (see Figure 5). In one method, *Lee* starts out with two contour points to define a starting linear segment. If the error between the linear segment and the actual FO contour points in the corresponding contour segment is smaller than the maximum allowable error, the linear segment can be extended to the next contour point until the maximum allowable error is reached (p.487, first column). In another method, *Lee* starts out with a set, **P**, of N_{p-1} FO points to approximate the contour so that N_p consecutive linear segments are used to represent the original contour. Using a maximum absolute error d_{max} between two points in the set and the actual FO values in the corresponding contour segment as a criterion, the set **P** is reduced and the number of consecutive linear segments is reduced. In *Lee*, the number of linear segments are determined by d_{max} , but each line segment ends at two contour points. For example, the number of linear segments for $d_{max}=10$ (Figure 8, bottom approximated contour) is smaller than the number of linear segments for $d_{max}=5$ (Figure 8, middle approximated contour). However, each of the linear segments starts at a contour point and ends at another contour point (see the approximation in the time period including $t=1\text{sec}$ and in the time period including $t=2\text{sec}$).

In contrast, in the invention as claimed, at least some of the end points of the linear segments are different from the start-point pitch values and end-point pitch values of the corresponding audio sub-segments. This means that at least some of the linear segments do not start at an actual pitch value and end at another actual pitch value.

For the above reason, claims 1, 11, 17 and 20 are clearly distinguishable over the cited *Lee* reference.

As for claims 2-5, 7-10, 12 and 15, they are dependent from claims 1 and 11 and recite features not recited in claims 1 and 11. For the above reasons, claims 2-5, 7-10, 12 and 15 are also distinguishable over the cited *Lee* reference.

At section 5, claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee* in view of *Swaminathan et al.* (U.S. Patent No. 5,704,000, hereafter referred to as *Swaminathan*). The Examiner cites *Swaminathan* for disclosing the steps of comparing candidates having the same length and selecting the candidate with minimum deviation (Col.5, lines 14-48).

At col. 5, lines 14-48, *Swaminathan* discloses using an autocorrelation function to select an optimal pitch candidate among the candidates generated for surrounding time instants such that the optimal pitch contour as selected is the closest fit to the path of the pitch trajectory.

It is respectfully submitted that claim 6 is dependent from claim 1 and recites features not recited in claim 1. For reasons regarding claim 1 above, claim 6 is also distinguishable over the cited *Lee* and *Swaminathan* references.

At section 6, claims 13, 14, 16, 18, 19 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee* in view of *Lumelsky* (U.S. Patent No. 6,246,672). The Examiner cites *Lumelsky* for disclosing the storage of compressed audio data.

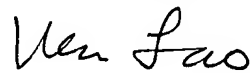
It is respectfully submitted that claims 13, 14 and 16 are dependent from claim 11 and recite features not recited in claim 11, and claims 21-23 are dependent from claim 20 and recite features not recited in claim 20. For reasons regarding claims 1 and 20 above, claim 13, 14, 16, 18, 19 and 21-23 are also distinguishable over the cited *Lee* and *Lumelsky* references.

Claim 24 has the limitation of the decoder as claimed in claim 17. For reasons regarding claim 17 above, claim 24 is also distinguishable over the cited *Lee* and *Lumelsky* references.

CONCLUSION

As amended, claims 1-24 are allowable. Early allowance of all pending claims is earnestly solicited.

Respectfully submitted,



Kenneth Q. Lao
Attorney for the Applicant
Registration No. 40,061

WARE, FRESSOLA, VAN DER SLUYS
& ADOLPHSON LLP
Bradford Green, Building Five
755 Main Street, P.O. Box 224
Monroe, CT 06468
Telephone: (203) 261-1234
Facsimile: (203) 261-5676
USPTO Customer No. 004955